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De Jong

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(54) **BLOCKING DEVICE AND METHOD FOR
BLOCKING A VEHICLE AND/OR
ENTRANCE TO A LOADING-UNLOADING
STATION, AND A DOCK AND
DISTRIBUTION CENTER PROVIDED
THEREWITH**

(58) **Field of Classification Search**
CPC B65G 69/005
See application file for complete search history.

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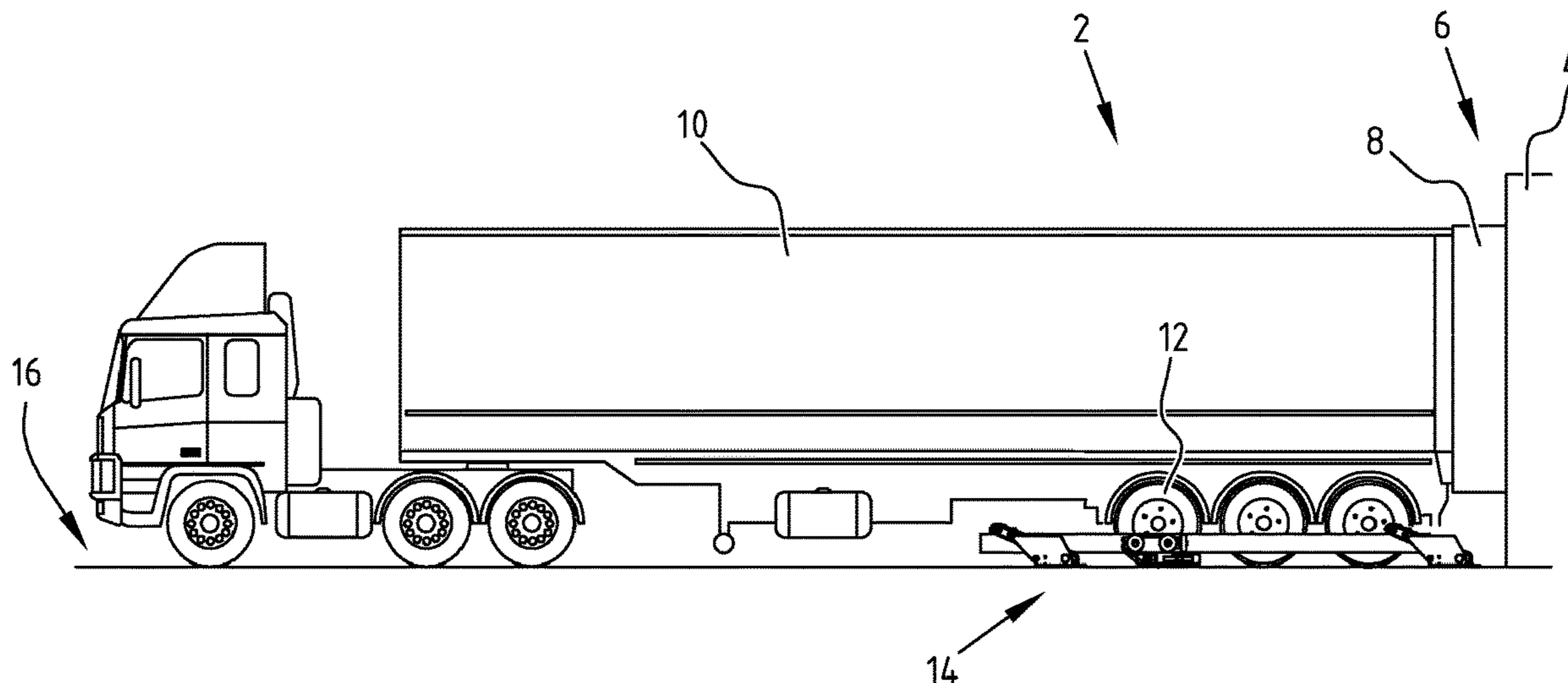
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(57) **ABSTRACT**
The present invention relates to a blocking device for blocking a vehicle and/or entrance to a loading-unloading station, a dock and/or distribution center provided therewith and method therefor. The blocking device includes: a guide track with guide track supports disposed along a driveway; a carriage attached to the guide track with a blocking element, with the carriage being capable of moving along the driveway; a blocking element extension mechanism configured to extend the blocking element between a retracted position and an extended blocking position; and a guide track drive configured for lifting and/or lowering the guide track. The guide track drive is further configured such that the guide track performs a horizontal movement when being lifted or lowered, and the vertical and horizontal movements are being performed simultaneously or successively.

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(52) **U.S. Cl.**
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20 Claims, 4 Drawing Sheets



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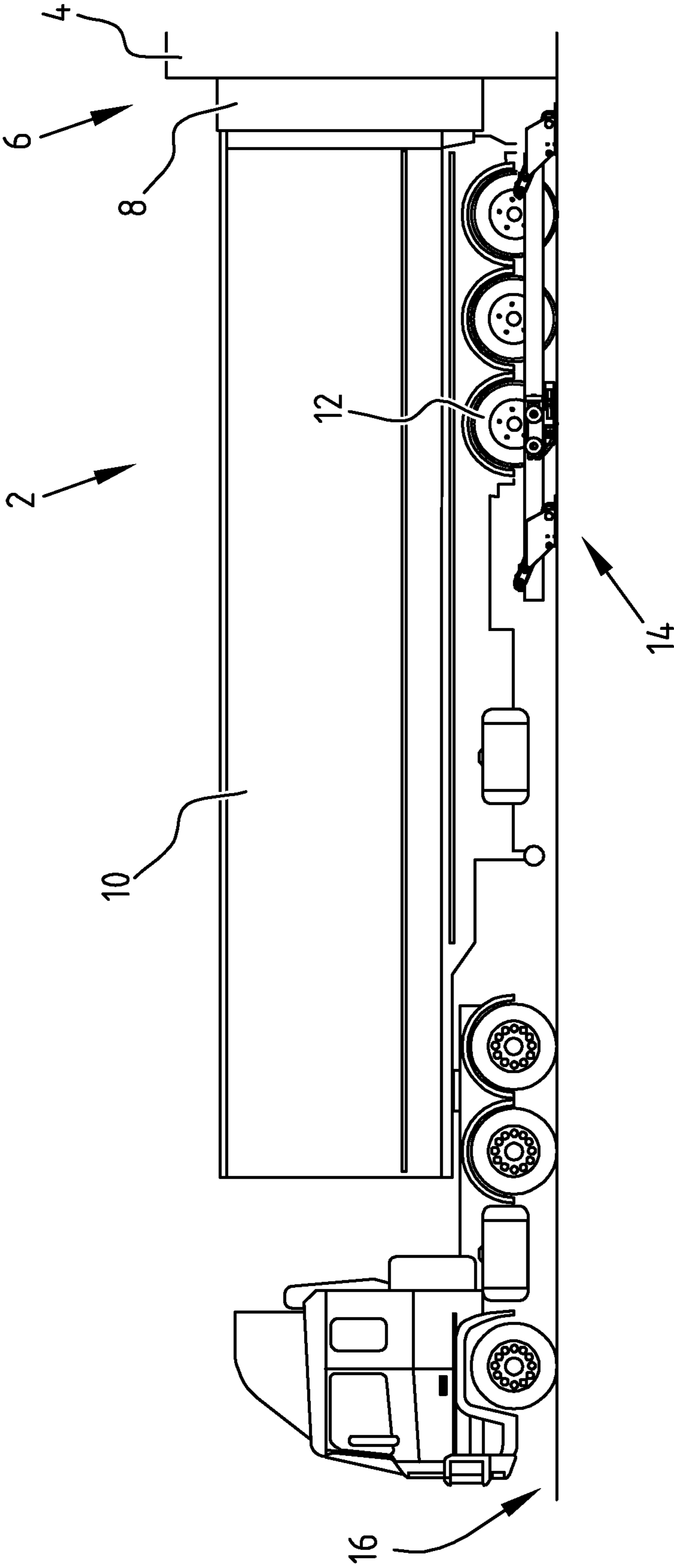


FIG. 1

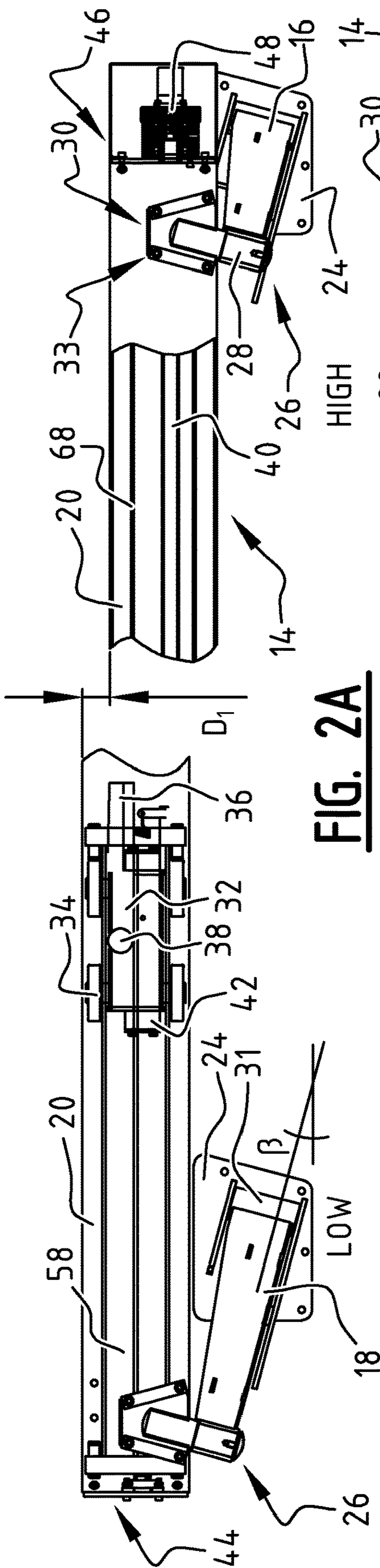


FIG. 2A

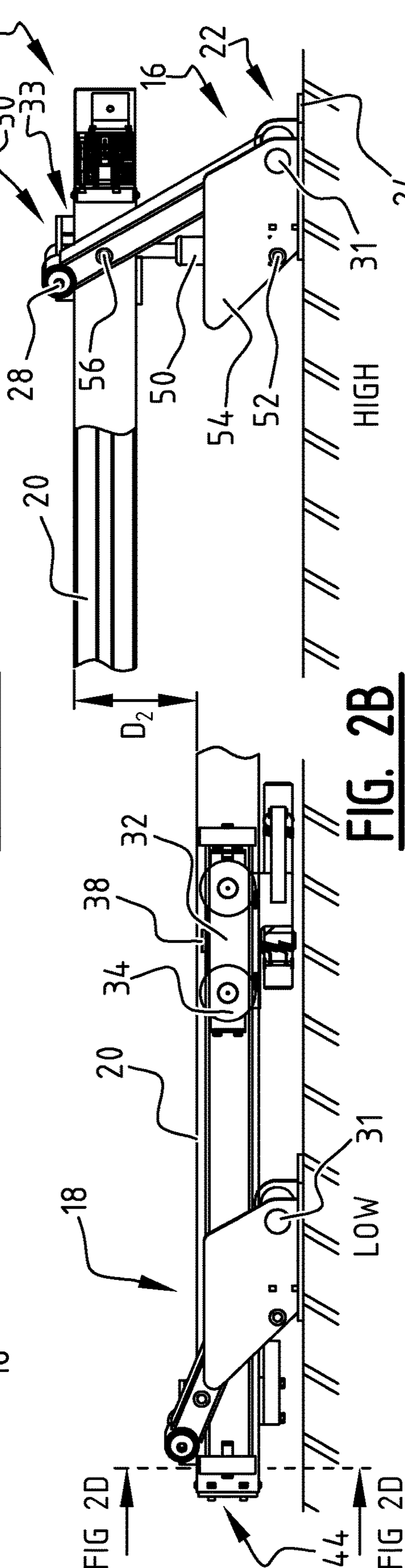


FIG. 2B

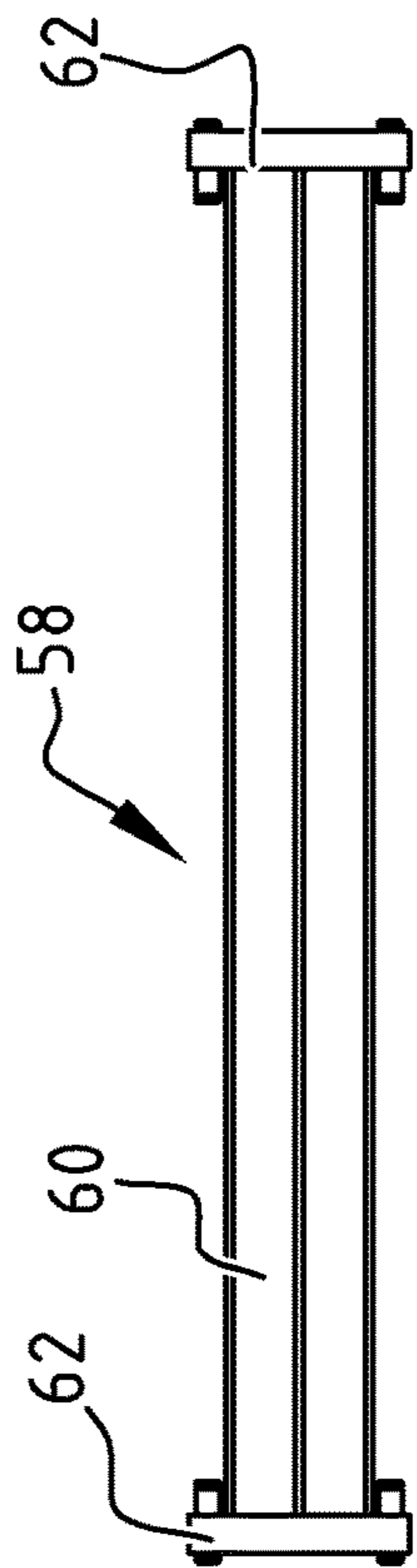


FIG. 2C

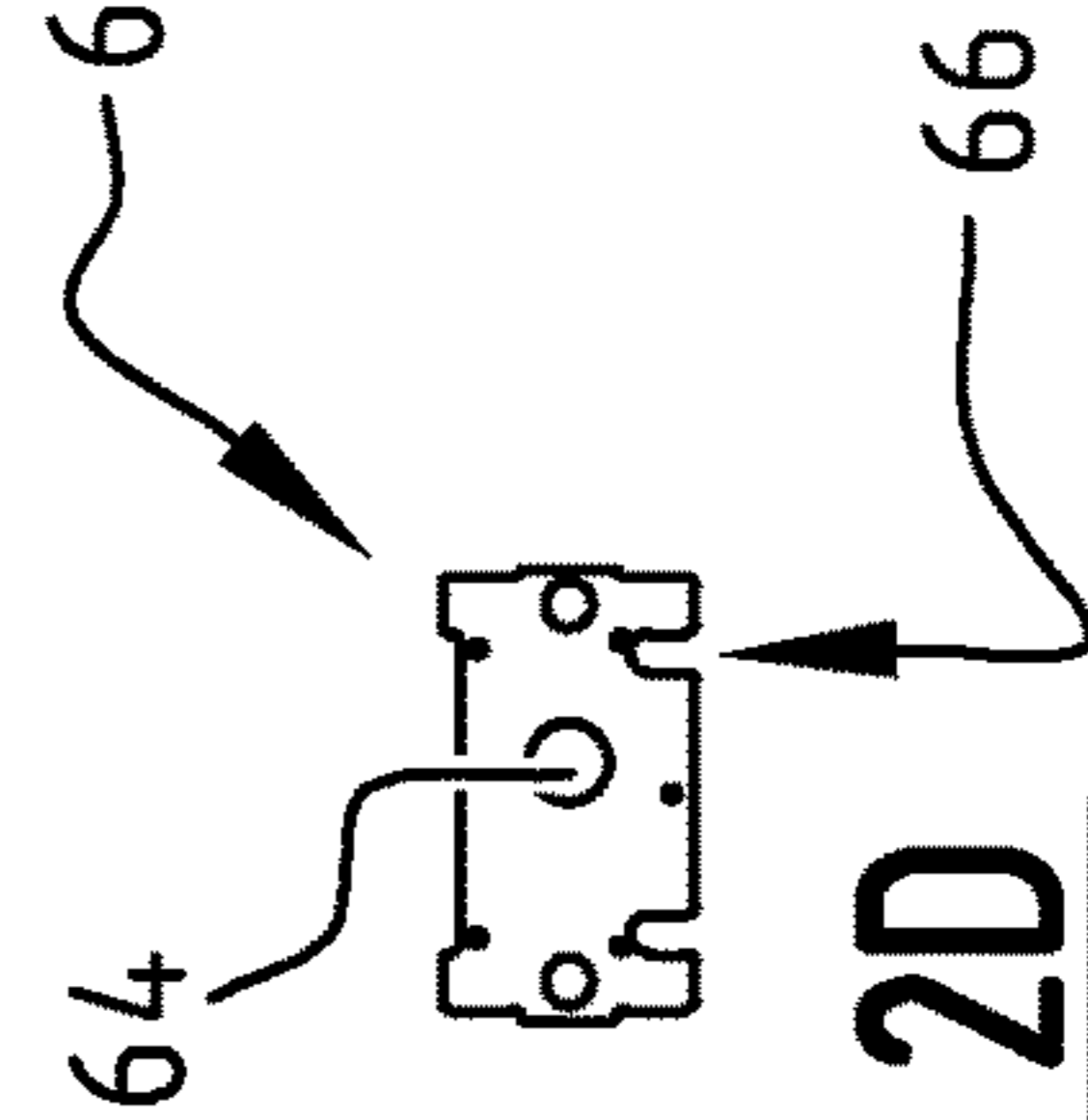
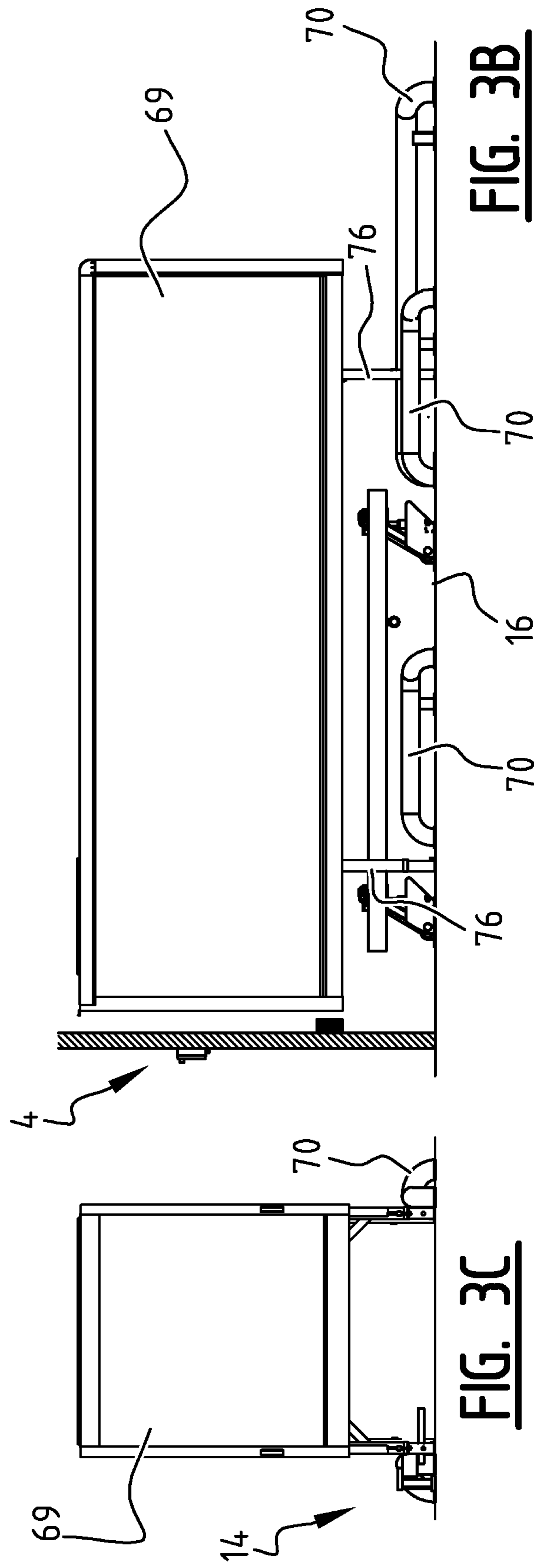
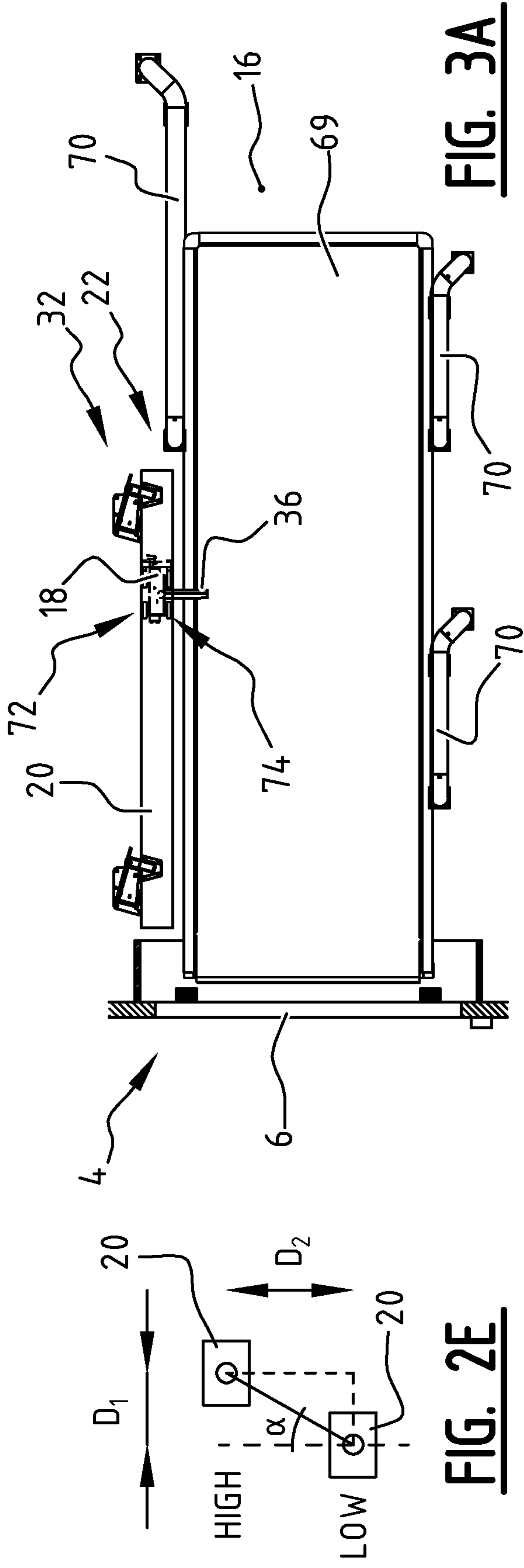


FIG. 2D



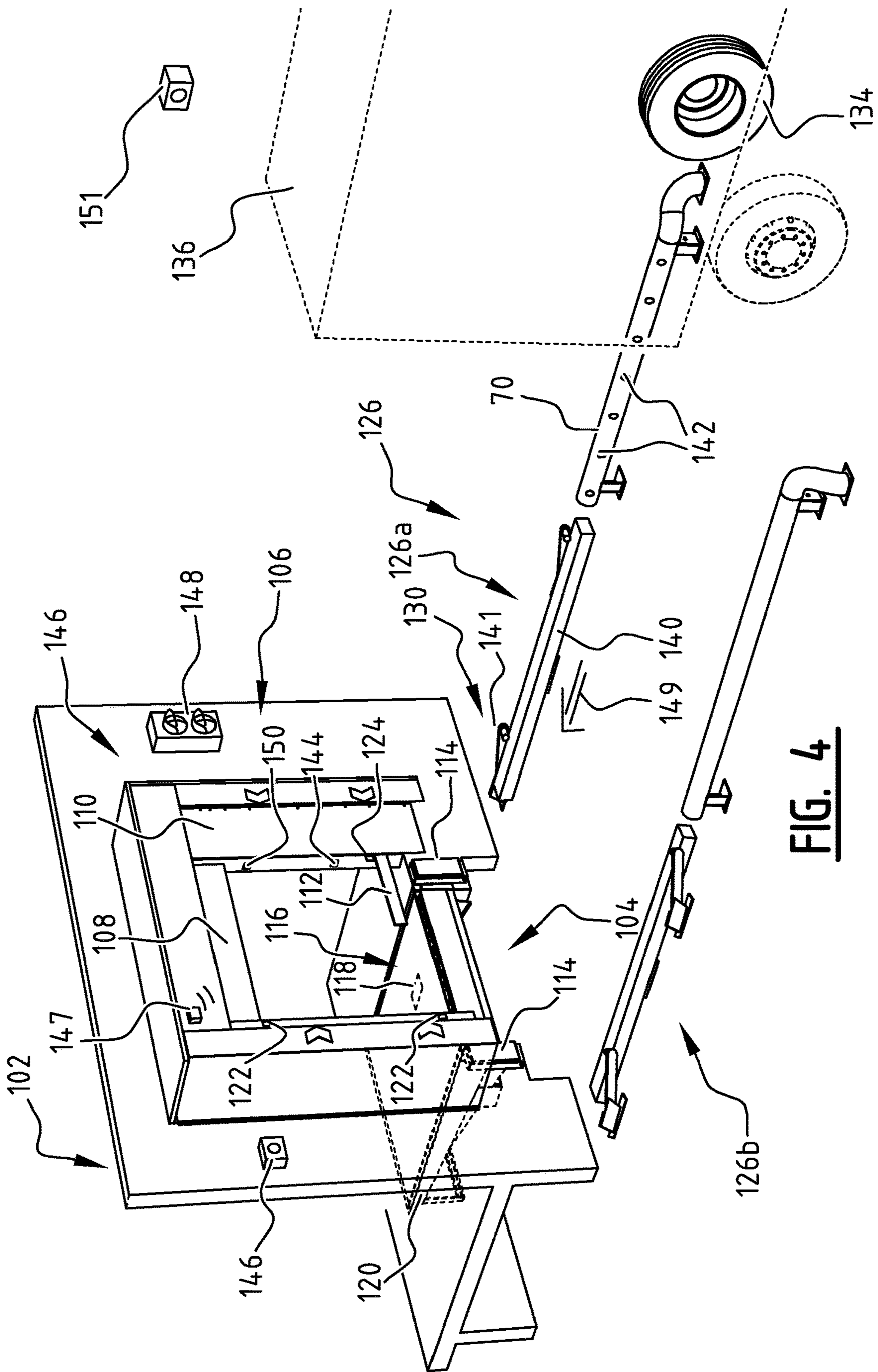


FIG. 4

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**BLOCKING DEVICE AND METHOD FOR
BLOCKING A VEHICLE AND/OR
ENTRANCE TO A LOADING-UNLOADING
STATION, AND A DOCK AND
DISTRIBUTION CENTER PROVIDED
THEREWITH**

CROSS-REFERENCE TO RELATED
APPLICATIONS

This application is the United States national phase of International Application No. PCT/NL2016/050752 filed Oct. 28, 2016, and claims priority to Dutch Patent Application No. 2015971 filed Dec. 16, 2015, the disclosures of which are hereby incorporated in their entirety by reference.

BACKGROUND OF TITLE INVENTION

Field of the Invention

The present invention relates to a blocking device for blocking a vehicle such as a truck. Also, the blocking device relates to blocking an entrance to a loading-unloading station. Such devices are often used at distribution centers that receive and send loads, including packages, parcels, pallets with products, consumable materials and finished products. Distribution centers include at least one dock or docking station configured to receive a truck or trailer or a container or other swap body for loading and/or unloading. Often, such dock comprises so-called dock houses including dock levellers, dock shelters and components thereof.

Description of Related Art

Blocking devices are described in US 2013/0341130 A1, and EP 2 371 745 A1. Such blocking devices comprise a carriage that is moved over a guide track. As soon as a truck is correctly positioned relative to the loading-unloading station/dock, the carriage is moved to the desired position. Next, the blocking element is moved into position in order to hold the rear wheel of the truck and making driving or rolling away impossible. Some of the conventional blocking devices comprise height-adjusting means for height adjustment of the guide track and/or the blocking element during use. This provides flexibility to deal with all types of vehicles, for example.

The importance of blocking devices for safety concerns have increased. Transport takes place over larger distances involving international transport. This leads to increasing communication difficulties between truck drivers and personnel of a distribution center, for example. This increases safety risks. In addition, less space is available for a dock such that manoeuvring a truck or swap body is more difficult.

SUMMARY OF THE INVENTION

The present invention has for an object to obviate or at least reduce one or more of the above-stated problems with by improving conventional blocking devices.

The present invention provides for this purpose a blocking device for blocking a vehicle and/or entrance to a loading-unloading station, the blocking device comprising:

- a guide track with guide track supports disposed along a driveway;

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a carriage attached to the guide track with a blocking element, with the carriage being capable of moving along the driveway;

a blocking element extension mechanism configured to extend the blocking element between a retracted position and an extended blocking position; and

a guide track drive configured for lifting and/or lowering the guide track, wherein the guide track drive is further configured such that the guide track performs a horizontal movement when being lifted or lowered, and wherein the vertical and horizontal movements are being performed simultaneously or successively.

According to the invention the terminology of loading-unloading station, a dock, a dock house and a docking station are used interchangeably. A dock can be provided with a dock shelter and/or dock leveller.

The guide track of the blocking device according to the invention is disposed along a driveway of a loading-unloading station or for instance a distribution center. A container, swap body or truck can be parked in the driveway along the guide track for the purpose of loading and/or unloading. Preferably, the blocking element is attached to the carriage that is moveably attached to the guide track and is capable of being positioned against one of the rear wheels or rear tyres of the vehicle to be blocked. When the blocking element, such as a rod, bar, pen etc. is in contact with the vehicle tyre, the blocking device blocks the vehicle. This provides an effective blocking of the vehicle preventing accidental and/or unauthorized movement of the vehicle. The blocking element is put in place with a blocking element extension mechanism that is capable of moving the blocking element between a retracted position and an extended blocking position.

The blocking element may also block access or entrance to the driveway and thereby preventing access to a container or swap body by an unauthorized vehicle. This prevents unauthorized picking up of the container or swap body, including unauthorized picking up of goods that are located outside the container or swap body, such as palletized goods. This reduces the risk of damage and/or theft of goods. By enabling the carriage to move along the guide track the position of the carriage and blocking element attached thereto can be chosen depending on the vehicle, swap body, container. This provides the blocking device with flexibility to deal with different types of vehicles and/or objects in the driveway.

When the blocking element is in a retracted position, a vehicle and/or object has access to the driveway and can be parked in the driveway or be removed therefrom. In case blocking is required, the blocking element is positioned correctly and moved into an extended blocking position. This prevents access to the driveway and prevents removing the vehicle. In the presently preferred embodiment the carriage is provided with a locking member that is capable of releasably locking the carriage relative to the guide track. This keeps the blocking element in its position.

In a presently preferred embodiment, the blocking element is rotated by the blocking element extension mechanism around a substantially vertical shaft when being moved between a retracted and an extended position or vice versa. It will be understood that other configurations for movement of the blocking element could also be envisaged in accordance with the invention. In the presently preferred embodiment the blocking element is moved into its position close to the ground of the driveway. Close to the ground sufficient space is available for the movement of the blocking element between the retracted and extended position without having

the risk that during its movement the blocking element comes to inappropriate contact with the truck or object that is placed in the driveway. This prevents damage to the truck or object. Furthermore, the functioning of the blocking device is not damaged.

The blocking device according to the invention further comprises a guide track drive that is configured for lifting and/or lowering the guide track, wherein the guide track drive is further configured such that the guide track performs a horizontal movement when being lifted or lowered. As mentioned earlier, close to the ground more space is available for movement of the blocking element. After moving the blocking element into position the guide track can be lifted and an effective blocking is achieved. When removing the blocking element the guide track can be lowered, where after the blocking element is rotated to its retracted position. This provides an effective operation of blocking and unblocking a vehicle and/or entrance to a loading-unloading station. Furthermore, by providing an adaptable engaging height of the blocking element on the vehicle and/or other object in the driveway, the flexibility of the blocking device to deal with a variety of vehicles and/or objects is increased.

The horizontal and vertical movement of the guide track can be performed simultaneously. This provides an efficient diagonal movement. Alternatively, the horizontal and vertical movements are performed successively. Preferably, the horizontal movement is performed as a first step before lifting the guide track in a second step. When lowering the guide track, preferably the guide track is moved vertically in a first step and horizontally in a second step. The successive combination of the horizontal and vertical movements results in an effective diagonal movement of the guide track.

Optionally, the blocking device is provided with calculation means involving a processor and a controller to calculate the desired height of the blocking element when being in an extended position. This may involve using the blocking element for determining the vehicle tyre diameter. In such embodiment the blocking element is brought into contact with the vehicle tyre at two or more different heights such that the vehicle tyre diameter can be determined. Using this information the calculation means determine the associated desired height of the blocking element. This obviates the need for additional sensors, thereby reducing the risk of sensor fouling due to rain, snow, wind and/or an object hindering the measurement such as leaves. This contributes to a robust blocking device.

The guide track drive may comprise a number of hydraulic/pneumatic cylinders and/or an electronic control. In a presently preferred embodiment the individual guide track supports are provided with a hydraulic cylinder for lifting and lowering the guide track. It will be understood that also other control elements can be applied in accordance with the present invention, including pneumatic cylinders, electronic controllers etc.

The guide track drive of the blocking device according to the invention is further configured to enable the guide track to perform a horizontal movement when being lifted or lowered. Such horizontal movement moves the guide track away from or closer to the driveway and a vehicle or object parked in the driveway. In a presently preferred embodiment according of the invention the horizontal distance between the guide track and a vehicle or object parked in the driveway is increased when lifting the guide track. When the guide track is at a low vertical position, i.e. close to the ground, a truck or object can be placed in the driveway. For blocking purposes the guide track is lifted to its desired position. Preferably, the blocking element is already moved

into its extended position capable of blocking the vehicle or object when lifting the guide track. This prevents damaging the truck or object. For example, this prevents damage to a rim or mudguard or other parts of a truck.

5 Preferably, the movements of the guide track in the vertical and horizontal directions are performed simultaneously, such that the direction of movement of the guide track is at an angle to the vertical. In a presently preferred embodiment the angle of movement is in the range of 5-30° with the vertical, preferably in the range of 10-20°, and most preferably in the range of 10-15°. This simultaneous movement in vertical and horizontal directions reduces the risk of undesired contact between the blocking device and the vehicle or object in the driveway such that the function of the blocking device remains in tact and/or damage is prevented.

In a preferred embodiment according to the present invention the guide track comprises an additional support extending over at least a part of the guide track in a lengthwise direction thereof.

By providing an additional support the stability of the guide track and the blocking device is improved. This obviates the need for over-dimensioning of the blocking device. Without an additional support the guide track must be capable of dealing with a moveable carriage and the associated forces at every position along the guide track. The additional support contributes to handling forces caused by the moveable carriage.

Preferably, the additional support is moveable along the guide track. By providing a moveable support additional robustness and stability to the blocking device is provided. The moveable support provides the desired strength and stability to deal with the forces associated with the moveable carriage at the actual location of the carriage along the guide track. Preferably, the additional support moves together with the carriage along the guide track. This can be achieved by providing a drive pin, catch pin or other connection.

In a presently preferred embodiment the carriage is moveable by a carriage drive, wherein the carriage drive comprises a spindle. In a presently preferred embodiment, the moveable additional support prevents sagging of the spindle, especially in view of the forces acting thereon in view of the moveable carriage. Also, the additional support prevents or at least reduces oscillation or swinging of the spindle.

In a presently preferred embodiment according to the invention the guide track supports are put at an angle to the lengthwise direction of the guide track.

Putting the guide track supports at an angle to the lengthwise direction of the guide track or driveway achieves an effective joint movement of the guide track when lifting the guide track in both a horizontal and vertical direction. Furthermore, by putting the guide track support at an angle to the guide track the required space is reduced. This enables providing adjacent driveways relatively close to each other, such that also adjacent docks can be placed relatively close to each other. This provides an effective dock and distribution center.

Preferably, the guide track comprises a support connection for hingedly connecting to one of the guide track supports. This enables moving the guide track and guide track supports relative to each other. In one of the presently preferred embodiment the support connection comprises a sliding connector that enables a sliding movement between the guide track support and the guide track. This prevents or reduces the movement of the guide track in a lengthwise direction due to a lifting movement. This sliding connector enables to substantially maintain the guide track in its

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position as seen in the lengthwise direction of the driveway irrespective of the actual height of the guide track.

In a further preferred embodiment according to the present invention the guide track drive of the blocking device comprises a first lifting mechanism for lifting the guide track.

By providing at least one lifting mechanism, preferably acting on a first end of the guide track, the guide track can be lifted effectively. Optionally, a further lifting support arm is provided at a second end such that a parallelogram configuration is achieved with the guide track, first lifting mechanism, lifting support arm and ground surface. In this embodiment the lifting support arm is driven by the first lifting mechanism.

In a presently preferred embodiment the first lifting mechanism lifts a first end of the guide track, and the guide track drive further comprises a second lifting mechanism for lifting a second end of the guide track, and a drive connection configured for connecting the first lifting mechanism with the second lifting mechanism.

By providing a first and a second lifting mechanism the guide track can be lifted as a modular unit, thereby substantially maintaining the guide track in a substantially horizontal orientation during lifting of lowering the guide track. Providing the lifting support arm as a second lifting mechanism a robust lifting operation can be achieved. By further providing a drive connection connecting the separate lifting mechanisms, the lifting operation of the two ends of the guide track can be performed jointly. Optionally, adjusting means are provided in the first and/or second lifting mechanisms to correct for height differences between the two ends of the guide track. These adjusting means may comprise a height sensor, a controller, adjusting valves or control elements.

Preferably, the lifting mechanisms are located in or at the guide track supports. This provides additional stability to the blocking device. Furthermore, this reduces the risk of damaging the lifting mechanisms.

In a further preferred embodiment according to the present invention the blocking device further comprises an anti-roll mode, wherein the blocking element engages a tire or other element at a first height, and a locking mode, wherein the blocking element engages the tire or other element at a second height that is higher as compared to the first height.

Providing a relatively low engaging height prevents the vehicle from rolling away during loading and/or unloading in an anti-roll mode. A relatively high engaging height prevents unauthorized driving away with a vehicle or object during parking of the vehicle or object in a blocking mode. This enhances the applicability and possible use of the blocking device according to the invention.

The present invention also relates to a dock of a loading-unloading station and/or a distribution center comprising one or more of these docks and/or blocking devices as described earlier.

Such dock and/or distribution center provide the same effects and advantages as described in respect of the blocking device.

In a further preferred embodiment according to the present invention, the dock comprises a second blocking device on the other side of the driveway. By providing a second blocking device an individual driveway is provided with separate blocking devices on the left hand side and right hand side of the driveway. This provides additional safety to vehicles and/or objects that are placed in the driveway.

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The invention further also relates to a method for blocking a vehicle and/or guarding a driveway of a loading-unloading station, the method comprising the steps of:

providing a blocking device as described earlier; and
blocking and/or releasing a vehicle and/or entry to the driveway.

Such method likewise provides the same effects and advantages as described in respect of the blocking device, dock of a loading-unloading station, and/or distribution center.

BRIEF DESCRIPTION OF THE DRAWINGS

Further advantages, features and details of the invention are elucidated on the basis of preferred embodiments thereof, wherein reference is made to the accompanying drawings, in which:

FIG. 1 shows a view of a loading-unloading station at a distribution center;

FIGS. 2A-E show a blocking device according to the invention in different positions;

FIGS. 3A-C show the blocking device of FIG. 2 used to block an object and/or entry to the driveway; and

FIG. 4 shows a driveway of a dock provided with two blocking devices according to the invention.

DESCRIPTION OF THE INVENTION

A loading bay area **2** (FIG. 1) is provided at a building with dock **4**. Dock **4** is provided with an opening or door **6** and a so-called dock shelter **8** for protection thereof. Truck **10** is reversed to area **2**, inter alia with rear wheels **12**. Truck **10** moves here substantially parallel to blocking device **14** in driveway **16**.

Blocking device **14** (FIGS. 2A-D) comprises a first guide track support **16** and a second guide track support **18** that is placed with an angle β to the lengthwise orientation of guide track **20**. One end **22** of supports **16**, **18** is connected to ground support plate **24**. The other end **26** of supports **16**, **18** is provided with pen or pin **28** that is connected to connection **30**. Supports **16**, **18** are rotatable relative to guide track **20** around axis **31**. Connection **30** is provided with hinge **33** enabling some movement between guide track **20** and support **16**, **18**.

Carriage **32** is moveably provided in blocking device **14** with wheels **34** that are moveable along guide track **20**. Carriage **32** is provided with blocking element or blocking rod **36** that is rotatable around shaft **38** and can be moved from a retracted position to an extended position. Carriage **32** is moved along guide track **20** with the use of spindle drive **40** and spindle nut **42**. Blocking device **14** further comprises spindle end bearing **44** that in the illustrated embodiment is close to second support **18**, and spindle bearing support **46** that in the illustrated embodiment is close to first support **16**. Spindle **40** is activated with the use of hydraulic motor **48**.

When blocking device **14** is moved from a low position close to ground **16** (FIGS. 2A low and 2B low) to a high position (FIGS. 2A high and 2B high) guide track **20** of blocking device **14** is moved over distance D_1 in a horizontal direction and simultaneous guide track **20** of blocking device **14** is moved over a distance D_2 in a vertical direction. In the illustrated embodiment the joint movement of distances D_1 and D_2 is defined by angle α (FIG. 2E) relative to the vertical. In fact, in the illustrated embodiment, $\tan(\alpha) = D_1/D_2$. In the illustrated embodiment the angle α is about 12.5° . It will be understood that, depending on the dimen-

sions of blocking device **14** and characteristics of the location or driveway **16**, angle α can be chosen differently. The vertical and horizontal movements over distances D_2 and D_1 respectively, can be performed simultaneously (schematically illustrated in FIG. 2E with a solid line) and successively (schematically illustrated in FIG. 2E with a dashed line). Both movements result in a diagonal repositioning of guide track **20**. The lifting of guide track **20** is activated with cylinders **50**. One end of cylinder **50** is connected via connection **52** to side plate or support plate **54**. The other end of cylinder **50** is connected via connection **56** to guide track **20**. In the illustrated embodiment guide track **20** is lowered when supports **16,18** move away from dock **4** with door **6**. It will be understood that an alternative configuration could also be envisaged wherein guide track **20** is lifted when supports **16,18** move away from dock **4** with door **6**.

Sliding spindle support **58** (FIG. 2C) comprises a tube like part **60** and end parts **62**. In use spindle support **58** is moveably attached to guide **20**.

End parts **62** (FIG. 2D) of spindle support **58** are provided with spindle support bore **64** and grooves **66** that in the illustrated embodiment slide over spindle **40** and edges **68** of guide track **20**, respectively. End parts **62** are connected with a number of tie-rods that extend through carriage **32**. In a presently preferred embodiment three tie-rods connect end parts **62**. It will be understood that a different configuration to connect end parts **62** with a different number of rods and/or different elements such as arms, tubes etc. can also be envisaged in accordance with the present invention.

In use, a vehicle or object is parked in driveway **16** when blocking device **14** is in its low position (FIGS. 2A low and 2B low). After the vehicle or object is parked, blocking device **14** is activated. Carriage **32** moves along guide track **20** to its desired position. Optionally, vehicle tyre diameters are determined by contacting vehicle tyre **12** at different heights with blocking element **36** to determine the optimal engaging height. Preferably, blocking element **36** is rotated from its retracted position around shaft **38** to its extended position, where after guide track **20** is lifted to its high position (FIGS. 2A high and 2B high). Blocking element **36** prevents rolling away or removing the vehicle and/or removing the object in driveway **16**, or gaining access to driveway **16**. When a vehicle is authorized to leave driveway **16** or to enter driveway **16**, blocking element **36** is retracted again. Preferably, before retracting blocking element **36** guide track **20** is brought to its lower position.

In the illustrated embodiment carriage **32** (directly or indirectly) contacts one of the end parts **62** and spindle support **58** with its two end parts **62** and connecting tie-rods or similar elements co-displaces with carriage **32**. When carriage **32** is moved in the opposite direction it contacts the other end part **62** and moves support **58** in the opposite direction. In the illustrated embodiment the distance between spindle bearings **44, 46** is about 3 meters. Support **58** provides additional support and stability by reducing this distance to about 1.5 meters. It will be understood that other dimensions can also be envisaged in accordance with the invention.

Swap body **69** (FIGS. 3A-C) is positioned at dock **4** of a distribution center having opening **6**. In the illustrated embodiment swap body **69** is positioned in front of opening **6**. Guiding elements **70** are positioned on one side of driveway **16**. In the illustrated embodiment, on the other side blocking device **14** positioned with guide track **20**, carriage **32** and housing **72**. In the illustrated embodiment, locking mechanism **74** locks blocking device **36** on carriage **32** on

guide track **20**. For example, lock **74** can be embodied similar to the lock illustrated in EP 0684915 or EP 2371745 that are incorporated by reference herein. Alternatively, or in addition thereto, spindle **40** acts as lock **74**, for example by switching off spindle motor **48**. In the illustrated embodiment swap body **69** stands on legs **76** on ground **16**. Blocking element **36** prevents a truck to move below swap body **69** and pick up swap body **69** unless authorized to do so.

Distribution center **102** (FIG. 4) comprises a number of docks or docking stations **104** that in the illustrated embodiment are provided with shelter **106**, door **108**, seals **110**, barrier **112** and bumper **114**. In the illustrated embodiment dock **104** further comprises dock leveler **116**. Dock leveler **116** is provided with load cell **118** for measuring the loads that are loaded and/or unloaded, and position sensor **120** to measure the (angular) position of leveler **116**. Door **108** is provided with one or more door position sensors **122** to detect the position of door **108**. Barrier **112** is provided with status sensor **124**.

In the illustrated embodiment and individual dock **104** of center **102** is provided with two blocking devices **126a,b** that are only schematically shown for illustrative purposes. An example of blocking devices **126a,b** is illustrated in detail in FIG. 2A-D. First blocking device **126a** is provided at one side of driveway **16** and a second blocking device **126b** is provided at the other side of driveway **16**.

In the illustrated embodiment blocking device **126** comprises locking system status sensor **141** and LED lights **142** of truck docking assistance system **144** to assist a driver of truck **136** when docking truck **136**. Also in the illustrated embodiment, assistance system **144** further comprises camera **146** for detecting truck positions, signaling light **148** for further assisting the driver of truck **136**, and projector **147** for projecting signals, such as arrows **149**, on the ground surface assisting the truck driver. Camera **151** is preferably remotely controlled and used for identification and/or recognition of truck **136** when entering the premises of distribution center **102**. After identifying truck **136** the driver is provided with a message or signals to direct truck **136** to the assigned dock **104** of center **102**. This significantly improves the docking process.

Blocking device **126** receives an authorization signal from assistance system **144** to enable access to driveway or release wheel **134** of truck **136**. This signal is given in reply to a request, for example received from the driver of truck **136**, to enter or leave the driveway, provided such request can be authorized by assistance system **144**, or alternatively by an operator and/or other external decision system. The authorization signal results in blocking device **126** removing blocking element **36**.

In addition to its preferred use in assistance system **144** camera **146** monitors part of the surroundings of center **102** **104** and/or monitors the inside dock area. Furthermore, camera **146** can be used to identify truck **136**, in a presently preferred embodiment through number plate recognition. Alternatively, a separate camera system is provided for identification purposes.

Optionally, camera **146, 151** provides information about the type of vehicle, such as truck **136**, to controller **150** enabling controller **150** to adjust the settings of dock components, such as leveler **116**, cylinder **50** for adapting the height of blocking device **126** and/or use vehicle specific information for debiting the user of center **102** and/or dock **104** for the docking operation that is performed. Optionally, camera **146** detects the vehicle registration, for example by the license plates, optionally providing the relevant infor-

mation to the accounting department such that the vehicle owner can be debited for the actual docking operation(s).

Furthermore, by monitoring the use of dock components, such as blocking device 126, the system is capable of providing information about how often and under what conditions the dock components are used. The user, for example the vehicle owner, can be debited on the actual use. Such option could be of interest also when dock equipment is rented or leased. In such case the system may communicate with an external network/system to enable monitoring and/or debiting the user or other party based on actual use by the equipment owner, for example.

The working of dock guard 126 will be illustrated with an example. Swap body 69 is required at opening 6 of dock 4. A truck enters driveway 16 with blocking device 126 enabling access to driveway 16 in an entrance blocking mode. The truck sets down swap body 69 and leaves driveway 16. Blocking device 126 then positions blocking element 36 such that swap body 69 can not be engaged by a truck. This prevents a truck of picking up swap body 69 as entrance to driveway 16 is blocked. As soon as swap body 69 can be moved, for example when goods have been loaded and/or unloaded and removal is authorized, the truck can pick up swap body 69. In that case, as soon as the truck is in the neighborhood of driveway 16 a request can be provided to one or more controllers 144, 150, for example, or an operator. If valid, such request can be authorized and the authorization signal can be provided to blocking device 126 such that blocking element 36 will be removed and entrance to driveway 16 is enabled such that swap body 69 can be picked up by the truck and can be removed from dock 4.

In an alternative vehicle blocking mode, blocking element 36 engages wheel 134 of the truck and blocks the truck from unauthorized leaving driveway 16. In a similar way, the truck may request permission to leave driveway 16 after which one or more controllers 144, 150 and/or an operator may grant such request and authorize blocking device 14, 126 to remove blocking element 36 such that the truck may leave driveway 16. With the use of one or more of controllers 144, 150 or another control system, blocking device 14, 126 can switch between its different modes.

It will be understood that individual features of the different embodiments or applications can be exchanged between or applied to other embodiments.

The present invention is by no means limited to the above described preferred embodiments thereof. The rights sought are defined by the following claims within the scope of which many modifications can be envisaged.

The invention claimed is:

1. A blocking device for blocking a vehicle and/or entrance to a loading-unloading station, comprising:

a guide track with guide track supports disposed along a driveway;

a carriage attached to the guide track with a blocking element, with the carriage being capable of moving along the driveway;

a blocking element extension mechanism configured to extend the blocking element between a retracted position and an extended blocking position; and

a guide track drive configured for lifting and/or lowering the guide track, wherein the guide track drive is further configured such that the guide track performs a horizontal movement when being lifted or lowered, and wherein the vertical and horizontal movements are being performed simultaneously or successively.

2. The blocking device according to claim 1, wherein a direction of movement of the guide track is at an angle to the vertical.

3. The blocking device according to claim 2, wherein the angle is in the range of 5–30° with the vertical.

4. The blocking device according to claim 1, wherein the guide track comprises an additional support extending over at least a part of the guide track in a lengthwise direction.

5. The blocking device according to claim 4, wherein the additional support is moveable along the guide track.

6. The blocking device according to claim 1, wherein the carriage is moveable with a carriage drive, wherein the carriage drive comprises a spindle.

7. The blocking device according to claim 1, wherein the guide track supports are put at an angle to a lengthwise direction of the guide track.

8. The blocking device according to claim 1, wherein the guide track comprises a support connection for hingedly connecting to one of the guide track supports.

9. The blocking device according to claim 8, wherein the support connection comprises a sliding connector enabling a sliding movement between the guide track support and the guide track.

10. The blocking device according to claim 1, wherein the guide track drive comprises a first lifting mechanism for lifting the guide track.

11. The blocking device according to claim 10, wherein the guide track drive further comprises a second lifting mechanism for lifting another part of the guide track, and a drive connection configured for connecting the first lifting mechanism with the second lifting mechanism.

12. The blocking device according to claim 1, further comprising:

an anti-roll mode, wherein the blocking element engages a tire or other element at a first height; and

a locking mode, wherein the blocking element engages the tire or other element at a second height above the first height.

13. The blocking device according to claim 2, wherein the guide track comprises an additional support extending over at least a part of the guide track in a lengthwise direction.

14. The blocking device according to claim 2, wherein the carriage is moveable with a carriage drive, wherein the carriage drive comprises a spindle.

15. The blocking device according to claim 2, wherein the guide track drive comprises a first lifting mechanism for lifting the guide track.

16. The blocking device according to claim 2, further comprising:

an anti-roll mode, wherein the blocking element engages a tire or other element at a first height; and

a locking mode, wherein the blocking element engages the tire or other element at a second height above the first height.

17. The blocking device according to claim 11, further comprising:

an anti-roll mode, wherein the blocking element engages a tire or other element at a first height; and

a locking mode, wherein the blocking element engages the tire or other element at a second height above the first height.

18. A dock of a loading-unloading station, comprising a blocking device for blocking a vehicle and/or entrance to a loading-unloading station, comprising:

a guide track with guide track supports disposed along a driveway;

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a carriage attached to the guide track with a blocking element, with the carriage being capable of moving along the driveway;
 a blocking element extension mechanism configured to extend the blocking element between a retracted position and an extended blocking position; and
 a guide track drive configured for lifting and/or lowering the guide track, wherein the guide track drive is further configured such that the guide track performs a horizontal movement when being lifted or lowered, and wherein the vertical and horizontal movements are being performed simultaneously or successively.

19. The dock according to claim **18**, further comprising a second blocking device on another side of the driveway.

20. A method for blocking a vehicle and/or guarding a driveway of a loading-unloading station, comprising the steps of:

providing a blocking device for blocking a vehicle and/or entrance to a loading-unloading station, comprising:

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a guide track with guide track supports disposed along a driveway;
 a carriage attached to the guide track with a blocking element, with the carriage being capable of moving along the driveway;
 a blocking element extension mechanism configured to extend the blocking element between a retracted position and an extended blocking position; and
 a guide track drive configured for lifting and/or lowering the guide track, wherein the guide track drive is further configured such that the guide track performs a horizontal movement when being lifted or lowered, and wherein the vertical and horizontal movements are being performed simultaneously or successively; and
 blocking and/or releasing a vehicle and/or entry to the driveway.

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